REMARKS

The Examiner is thanked for accepting the drawings, and for withdrawing the 35 USC § 112 rejections of the previous Office Action.

In the Final Office Action, the Examiner maintains the rejection of claims 1-3 and 7-10 of the prior Office Action. The Examiner also rejects claim 10 under 35 USC § 112 as being indefinite (due to a typographical error made in amending the claim). In addition, claims 7-10 now stand rejected under 35 USC § 102(e) as being anticipated by Karlsson et al. (US Patent Application Publication US 20020057730, hereinafter "Karlsson"). Independent claims 11, 16 and 21 stand rejected under 35 USC § 102(b) as being anticipated by Buzzi et al. (Blind Adaptive Multiuser Detection for Asynchronous Dual-Rate DS/CDMA Systems: IEEE Journal on Selected Areas in Communications Vol. 19 No. 2 pp. 233-244, February 2001, hereinafter "Buzzi"). Claims 1-3 also stand rejected under 35 USC § 103(a) as being unpatentable over Karlsson (same as above) in view of Keskitalo (same as above).

With respect to the rejection of claim 10 under 35 USC § 112, an amendment has been made to correct the typographical error that rendered the claim indefinite.

The amended claims include extracting information from a composite signal that contains both high-power/high-data rate data signals and low-power/low-data rate voice signals. Initially, the data signals are extracted. Then, the voice signals are extracted by first canceling the contribution of the (just-extracted) data signals. It is appropriate to begin by extracting only the data signals from the composite signal because the data signals have a greater interfering effect on the voice signals,

than the voice signals have on the data signals. The combined complexity (and therefore the power consumption) of the circuits needed to extract only data in a first stage and only voice in a second stage is less than the complexity of the circuits needed to extract both types of signals in one stage. No similar concept is disclosed or suggested, alone or in combination, by the cited prior art.

It is important to recognize that the system and method of the present application will work even if voice and data signals are both received from the same WTRU in the same communication connection. In other words, the circuit complexity is reduced by first extracting the data signal(s) and then extracting the voice signal(s) as described in the application, even when both data and voice signals are contained in a composite signal received from a single WTRU. This is in contrast to the cited references.

Keskitalo for example discloses a system wherein the reception of a signal from a particular mobile station is improved solely by canceling the contributions of signals received from other mobile stations. (*see, e.g.,* col. 2 lines 56-60, "... method ... characterized in that the detection of the desired signal utilizes simultaneously signals received from several mobile stations ...."; col. 3 lines 21-25, "... preferred embodiment ... use[s] for interference cancellation signals that have been received from other terminal equipments, that have already been detected and that interfere with the desired signal."). However, no attempt is made in Keskitalo to simplify the circuitry required to extract the information from a composite signal received from the one particular mobile station. In other words, in an environment in which there

exists only one transmitting mobile station and that station transmits a composite signal containing both high power data and low power voice signals, Keskitalo will not have any effect. This is so because there are no signals from other sources to cancel. This is easily distinguished from the present application as amended, which provides reduced complexity by first extracting only the data signal(s) using a first stage designed particularly for data signals, then canceling the contribution of the data signal(s) from the composite signal, then extracting only the voice signal(s) using a second stage designed particularly for voice signals. Keskitalo does not teach, disclose or suggest, and thus does not support, such a concept.

Karlsson is directed to the determination of spreading factors in CDMA systems, and the use of those spreading factors in various types of receivers. Karlsson is particularly useful in CDMA systems that use variable spreading factors, and/or where there are periods of so-called "zero rate" transmission, i.e., when the control channel is active but the data channel is not. Once again, although Karlsson discusses interference cancellation, nothing in Karlsson discloses the particular type of interference cancellation described in the present application. Karlsson is directed to detecting in a composite signal a particular desired signal using a particular spreading factor and canceling the interfering effects of other signals using other spreading factors. Thus, Karlsson teaches discriminating between signals based only on their different spreading factors, but does not teach discriminating between signals based on their different power levels, as the present application teaches. In an environment in which there are composite signals

comprising both high power data signals and low power voice signals, in Karlsson both types of signals would be despread at the same time. Karlsson does not teach, disclose or suggest, from a composite signal containing both high-power data and low-power voice signals, detecting first the high-power data signals using a detector type designed particularly for that signal type; then removing the interfering effect of those signals from the composite signal; then detecting the low-power voice signals using a detector type designed particularly for that signal type.

With respect to Buzzi, this reference is an analysis and assessment of the effectiveness of three different DS/CDMA access schemes wherein multiple users are allowed to transmit with one of two different data rates (high and low). The effectiveness of data detection in each scheme is assessed using various detectors, but nowhere does Buzzi teach first detecting signals of the signal type which interferes most with the other signal type, canceling the first detected signals as interference from the composite signal, then detecting signals of the other signal type. Applicants respectfully assert the elements of the present application are simply not found in Buzzi. Although the Examiner states that Buzzi teaches, from a composite signal containing both high-power and low-power signals, detecting a high power group of signals, canceling the contribution of those signals from the composite signal as interference, and detecting a low power group of signals (Final Office Action, pp. 6-7), Applicants are not able to find these elements in the cited locations.

Rather, for example, Buzzi in Figure 5 (cited in the Final Action as illustrating various elements disclosed in the present application) illustrates a so-called FREquency-SHift (FRESH) realization of the so-called Cyclic recursive-least-squares (RLS) Algorithm introduced in the article. In effect, it illustrates a signal

detector that isolates a single high data rate signal in an environment of mixed multiple high data rate and multiple low data rate signals. (*see, e.g.*, pp. 238-240, "... notice that it [a cyclic RLS algorithm] may be implemented based on the knowledge of the signature waveform and of the timing of the user [singular] to be decoded .... Additionally, since the modified RLS algorithm processes the vector *r*(.), it is easily seen that it may be implemented through the so-called FREquency-SHift (FRESH) realization as depicted in Fig. 5."). There is no detection of a plurality of high data rate or high power level signals as a group, no canceling of the effect of that group on the composite received signal, and no subsequent stage that detects a low power group of signals; nor are those concepts taught elsewhere in Buzzi.

The Final Action states at p. 7 that Buzzi discloses, in equation 3 and in figure 5, an interference canceling device for receiving detected data of a high power level group of signals, canceling the contribution of the high power level group detected data from a plurality of communication signals as an interference canceled signal, and detecting data of the low power level group of signals from the interference canceled signal. As noted above, Figure 5 depicts the FRESH realization of the modified RLS algorithm, but does not pertain to any aspect of the present application. Equation 3 and the paragraph within which it appears have to do with allocating different carrier frequencies to high and low data rate users, and the development of an access scheme called VCFRS (variable chip rate with frequency shift). Therein Buzzi states, "... it is possible to allocate the carrier frequency of the signals from the low-rate users at some distance from the carrier frequency of the signals from the high-rate users, so as to reduce mutual interference between high-rate and low-rate users." Presumably, in a situation in which the high and low data rate users are sufficiently separated in frequency, no

interference cancellation would even be necessary. Buzzi states "This idea thus leads to the VCFS access method, in which the spreading sequence for the *k*th low-rate user is given by [Equation 3] ...." Thus, Equation 3 does not have to do with interference cancellation; rather, it gives a spreading sequence. The Final Action also states that Buzzi (p. 235 second paragraph) discloses a low data rate data detection device comprising a matched filter. At the cited location, Buzzi states, "Notice that, if $M = 1$ [in the preceding equation] and the VSL [variable spreading length] scheme is in force, projection onto the above set coincides with plain chip-matched filtering and chip rate sampling, while letting $M > 1$ corresponds to oversampling the received waveform." This does not describe a matched filter; rather, it describes a VSL access scheme, which performs like a matched filter under the described circumstances.

Thus, Applicants respectfully submit that nothing in any of the cited references teaches, discloses or suggests, alone or in combination, the teachings of the current application as amended. Entry of this amendment and reconsideration of the application are respectfully requested.

Respectfully submitted,

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